

Aliens In Your Socks

Subject: Life science

Grade: 6-8

Lesson Topic: seed dispersal (Fall activity)

Length: 1-2 periods
+time to grow plants

Learner Objective:

Students will understand the mechanism of seed dispersal including wind, wildlife and human causes.

Students will investigate why alien weed species tend to have multiple means for dispersal than most plants and tend to germinate easier.

Introduction:

This popular activity has many versions and most of them are used to address the topic of plant seed dispersal within the environment. Since invasive weed species tend to produce large numbers of seed, are suited to a variety of habitat and may benefit from several methods of dispersal, *Aliens In Your Socks* is particularly well suited to adapt this activity to the study of invasive weeds.

Content:

Invasive weed species produce amazing numbers of seed, from thousands to millions per plant (see the lesson, *Alien Invasion* in this unit for statistics of particular species). Along with impressive numbers of seed, invasive weed species tend to have seed that germinate and grow faster in a wider range of environmental conditions than do most native species that are finely adapted to specific [niches](#). Invasive species, by germinating early and growing fast, are also able to utilize soil nutrients and water resources before the native species. Additionally, the invasive species typically have evolved a variety of means of defense against predation. All of these factors contribute the aggressive establishment of invasive weed species. Seeds of any one species may be dispersed via the wind, carried by animals (seeds can "stick" or "cling" to animal fur), and many seeds are consumed by birds and animals and then dispersed when the animal defecates. One way for preventing the spread of weed species is for students to understand that human activities are a leading cause of weed dispersal... as one example, the seeds that normally may stick to an animal's fur can also cling to our clothes, our vehicle tires and many other articles we take through the brush on our excursions. By understanding the human role in seed dispersal, students will be in a position to help control the invasion by watching their own actions in the field and by educating others.

Materials and Supplies:

- Old socks (preferably large "rag" or woolly type)
- Mild carton planters or flower pots
- Commercial potting soil
- Gro-lux light on adjustable stand
- Magnifying glasses
- Tweezers
- Spray bottle
- Zip-lock bags
- Butcher paper to cover tables
- Weed journals

Anticipatory Set:

You will need to tell the students in advance of this activity to bring in some woolly socks (even better if they ask their folks for large socks, but make sure the parents understand that the socks will not be coming home!). Don't tell the students why the socks are needed. As the socks come in, keep them in a tub or basket on "display," partly as a reminder to those have forgotten to bring in socks, but also to build curiosity and anticipation.

Activity Outline:

Review with the students the definition and characteristics of alien weed species. Have them create a list of all the ways they think seeds might be dispersed and diagram their ideas on the board or large sheet of paper. Don't forget to discuss the ways that plants might move from country to country, or continent to continent across the sea. Create sub-categories under each of their ideas, i.e., if they mention "animals," lead them to the various ideas on how animals might specifically disperse seeds. Another example might be:

Humans —→ Recreation —→ Horse camping —→ Hay
(seeds are transported to our forests in the horse feed)

In the outdoor portion of this activity, students will form a line at the edge of field or forest and you will produce the basket of old socks. Students will pull the socks over their shoes. Depending on the number of students and/or sock, they may put socks on one or both shoes). The socks go *over* their shoes for the purpose of preventing puncture wounds or other injuries from, essentially, going barefoot in the field. Have the students walk a designated distance and return. They should then carefully remove their socks, turning them inside out as they do so in order to contain any seeds that may have stuck to the socks (alternatively, they can carefully remove their socks and place them in a zip-lock bag).

Once back in the classroom, the students should work over a large sheet of white paper or butcher paper (or cookie trays if you have enough for everyone), turn their socks right side out, and examine the sock for seeds that may be stuck to or embedded in the sock. Some seeds may be too small to see, or blend in perfectly with

the color of the fabric, so caution the students not assume “there isn’t anything there!” or “I found them all!” If there are too many seeds to count, have them cut the sock lengthwise, count the number of seed in several measured squares (2x2 cm), measure the total area, and calculate the estimated total. If there are multiple types of seeds represented they should describe and record the information in their weed journals. All of the students should cut a weedy section of their socks, approximately 10x30 cm. If they removed a number of seeds they can “re-apply” the seeds to their sock strip. The weedy sock strips can be planted in moist, sterile (seed free) soil and then arranged beneath a Gro-lux light positioned approximately 20 cm above the planters. Be sure to keep the soil moist with the spray bottle, but do not over water (or this becomes a moldy experiment!). In their weed journals, the students should record where they walked (describing the habitat), the date, a description of what they found on their on their socks (particularly using the magnifying glasses to examine the surface of the seeds), the number and kind of seed, and their predictions about what might grow out of their socks. The students should make regular observations and record their findings in their weed journals. Germination time will vary with species, from a couple of days to several weeks. You can best determine when to end this activity as it fits with other scheduled activities, but because the germination phase works “in the background,” you may go on with other activities in this unit. Remember to properly dispose of any weed species that are grown (as outlined in this unit’s previous activities).

Closure and Assessment:

How many seeds germinated? Were the students able to determine which species were present? Were their predictions correct? Have students share observations about the surfaces of seeds and relate that to how the seeds hitchhike to new areas. How many different kinds of seeds were found? How many native species were dispersed by this method? Was the mechanism for adhering to clothing the same in all seeds? What can they do to minimize the spread of seeds?

Independent Practice and Related Activities:

Design an experiment to discover how many types of surface to which a particular seed might “stick.”

Continue growing the plants to a mature state in order to truly identify the plants and differentiate between invasive and native species that may have been found.

Resources:

XID Identification System

Photographs and weed identification guides available from county, state or federal agencies.

Vocabulary:

Dispersal, herbivory, niche, predation

National Science Education Standards:

Science as Inquiry - CONTENT STANDARD A:

As a result of activities in grades 5-8, all students should develop

- ☐ Abilities necessary to do scientific inquiry
- ☐ Understandings about scientific inquiry

Life Science - CONTENT STANDARD C:

As a result of their activities in grades 5-8, all students should develop understanding of

- ☐ Structure and function in living systems
- ☐ Reproduction and heredity
- ☐ Regulation and behavior
- ☐ Populations and ecosystems
- ☐ Diversity and adaptations of organisms